CHAPTER 3

HELIPORT AND HELICOPTER STAGEFIELD LIGHTING SYSTEMS

3-1. General design and layout criteria

a. Heliport runway. Figures 2-1, 2-4, 3-1, 3-2, and the design criteria set forth herein are intended to guide in designing and installing a permanent Army heliport lighting system utilizing medium intensity elevated and semi-flush lights at a heliport having two 75-foot wide by *625*-foot long intersecting runways with 40-foot wide connecting taxiways and 25-foot wide adjacent surface treated shoulders. Changes in the layout or design maybe to fit the requirements of a particular heliport runway installation, including the basic one runway configuration. Pavement configurations not specifically covered by these criteria will be lighted in accordance with the intent of these criteria.

b. Helicopter stagefield. Figure 3-3 and the associated design criteria contained herein are intended as a guide in designing and installing a permanent Army helicopter stage field lighting system.

3-2. Description

a. Heliport runway.

(1) Runway lighting system. The line of runway lights (alternate white and blue) located on each side of the heliport runway will be not less than 5 feet nor more than 10 feet from the paved edge of the runway; and will be of the elevated type. Spacing within the line of lights will be approximately 20 feet, but not less than 15 feet nor more than 25 feet. Where intersecting runways or intersections between runways and taxiways occur, spacing of runway lights will be uniform between paving intersection points of tangency (PTs) with each section calculated separately. White lights on each separate runway will be connected to the appropriate lighting circuit; the blue lights on each runway will be connected to the appropriate taxiway lighting circuit as shown on figure 3-1. Where the runways intersect at the extreme ends, all lights, both white and blue, for the particular runway not having a connecting taxiway thereto, will be connected to the appropriate runway circuit as shown on figure 3-2. Corner lights will be installed approximately 2 feet out from the paving edge, and in line with their respective runway lights. White and blue runway lights around threshold ends of runway intersections will be the semiflush type. Where only one runway is constructed, blue lights will not be provided along the runway edge; white lights only will be provided, with spacings as indicated above.

(2) Runway threshold lighting system. The line of semiflush threshold marker lights will be 180 degrees aviation green/180 degrees aviation red, located not less than 5 feet or more than 15 feet from the ends of the runway, with lights spaced approximately 17 feet on centers. The outermost light of each group will be located in line with the corresponding row of runway lights. Each threshold light group will contain no fewer than six lights. When the lines of runway lights are located the maximum distance of 10 feet from the paved edges of the runway, an additional semiflush light will be installed in each group making a total of seven lights per group. The threshold lights will be connected in series with the appropriate runway lighting circuit.

b. Helicopter stagefield.

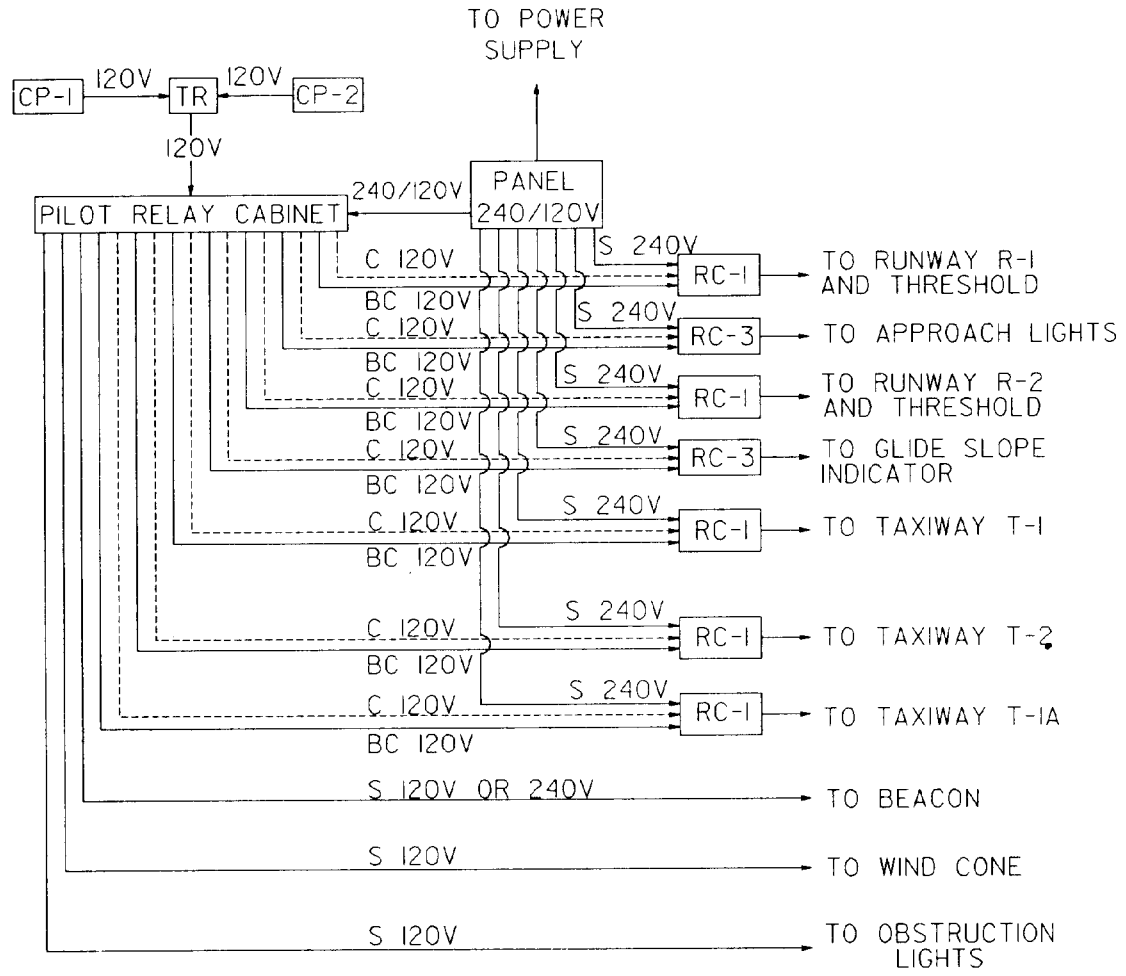
(1) Location and spacing of lane edge lighting fixtures. Aviation white lights will be located on a line not more than 3 feet from the edge of the full strength pavement that is designated for lane use as illustrated in figure 3-3. The longitudinal spacing should not be less than 100 feet nor greater than 200 feet. Spacing will permit a minimum of 5 lane edge lighting fixtures on each side of the stagefield. When two or more stagefields are located parallel and in close proximity to each other, the edge lights will be configured so as to not line up and create false runway orientations when helicopters are approaching from perpendicular or oblique angles to the stagefield centerline. The height of elevated fixtures will not exceed 14 inches above grade. If snow accumulations of 12 inches or more will be frequent, mounting height may be increased to not more than 24 inches above grade. The light should be mounted on a frangible post not more than 2 inches in diameter or be mounted with a breakaway coupling. Each lane will be equipped with a rheostat or 5 step regulator so as to vary the light intensity from a dull glow to full light intensity (see para 2-2 and FAA Advisory Circular AC 150/5340-24 for additional lighting information).

(2) Lane threshold and lane end lighting fixtures. Combination threshold and lane end lighting fixtures, will be located on a line perpendicular to the extended centerline of the stagefield lane. The fixtures should be not less than 2 feet nor more than 10 feet outboard from the designated threshold of the lane. These lights should consist of four groups of two lights symmetrically located perpendicular to the extended center line (see para 2-Sand FAA Advisory Circular AC 150/5340-24 for additional lighting information).

c. Refueling area lights. Explosion-proof aviation light fixture assemblies and associated wiring will be used when lighting fixtures are required within 50 feet of an aircraft fuel inlet or fuel system vent and within 63 feet of an aircraft direct fueling outlet/hose reel pit.

3-3. Lighting equipment

The types of lights described below will be used at runways and thresholds. Each type of light is described by a



LEGEND

CP-1	CONTROL POINT-PRIMARY (CONTROL TOWER)
CP-2	CONTROL POINT-ALTERNATE (VAULT)
RC-1	REGULATOR
RC-3(1)	REGULATOR
RC-3(2)	REGULATOR
TR	TRANSFER RELAY
BC	BRIGHTNESS CONTROL
C	CONTROL
S	SUPPLY

NOTE:

ELECTRIC POWER SOURCE, MAIN SERVICE SWITCH, EMERGENCY GENERATOR AND TRANSFER SWITCH, AND MAIN DISTRIBUTION PANEL NOT SHOWN. INSTALLATION OF THESE ITEMS WILL BE DESIGNED TO MEET LOCAL CONDITIONS.

Figure 3-1. Typical one line block diagram for Army heliport lighting system.

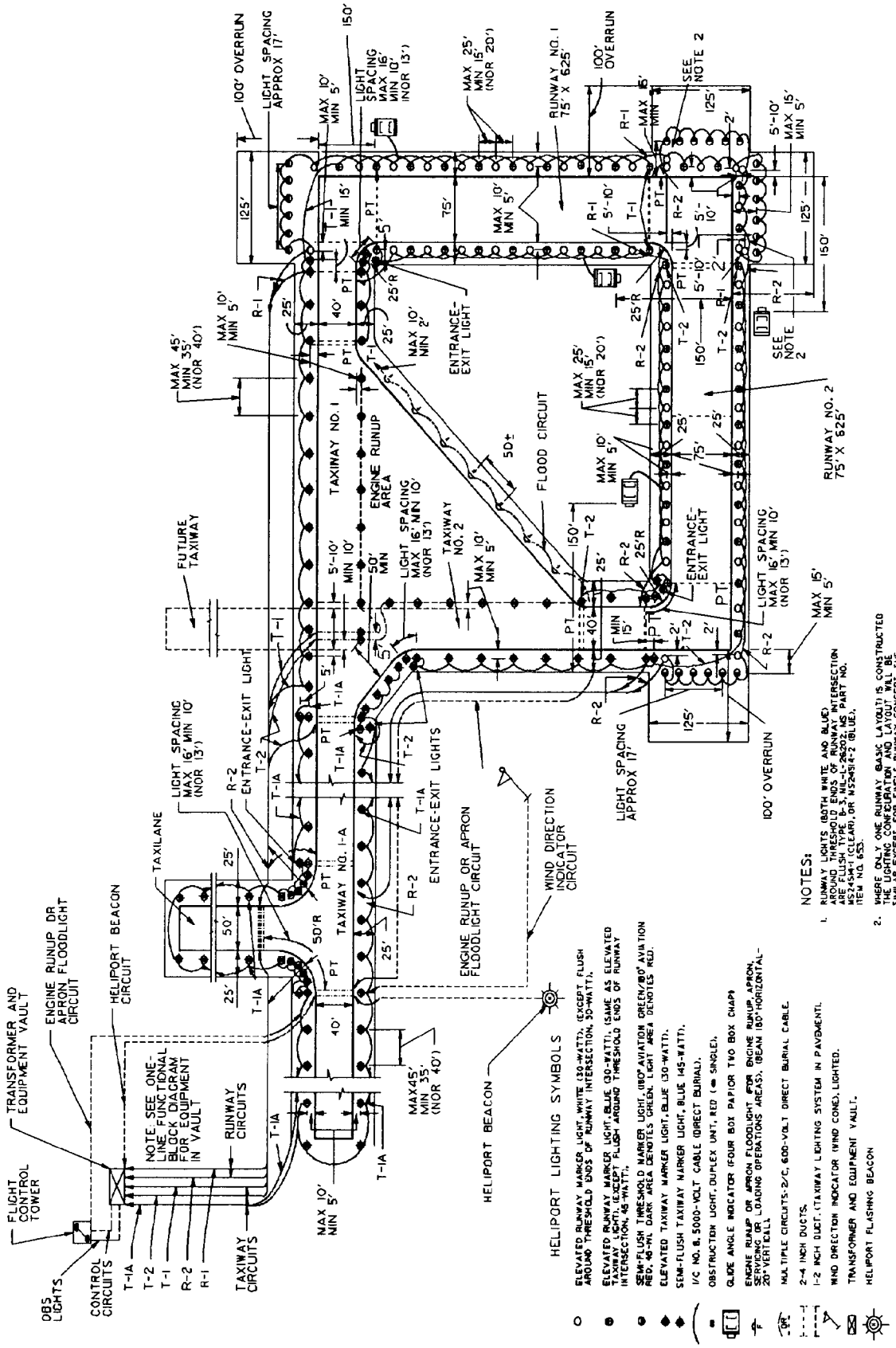


Figure 3-2. Layout Army heliport lighting facilities.

descriptive name, USAF Item Number, or FAA Number or Advisory Circular, and where existing, by Military Standard or Part Number and Military Specification. Mounting accessories are not noted herein, but are shown on the installation detail drawings, figures 2-3 and 2-4 of this manual.

a. Elevated runway lights. Elevated runway lights will be omnidirectional, medium intensity, Type M-1, Item No. 294, conforming to Mil. Spec. MIL-L-7082. The lamp for this light will be 30 watts, 6.6-ampere, T-10 medium prefocus base, item No.334, conforming to Mil. Std. MS-25012-1 and Mil. Spec. MIL-L-6363. The lens will be asymmetrical, clear, Item No.335, conforming to Mil. Spec. MIL-L-7082. FAA type L-861 fixtures may be used instead of type M-1 fixtures.

b. Semiflush runway lights. Semiflish runway lights will be medium intensity, class B-3, Item No.654, conforming to Mu. Std. MS-27033 and Mil. Spec. MIL-L-26202. The lamp for this fixture will be 45 watts, 6.6-ampere, PAR 56, conforming to Mil. Std. MS-24488 and Mil. Spec. MIL-L-6363. FAA type L-852, class 2 fixtures may be used in lieu of military specification fixtures.

c. Threshold lights. Semiflush threshold lights will be similar to the semiflush runway lights noted above except that a 180 degrees aviation green/180 degrees aviation red filter conforming to Mil. Std. MS-24502 will be furnished with the light.

d. Runway blue lights. Blue lights at runways whether elevated or semiflush, will be as in chapter 6.

e. Refueling area lights. Fixture assembly must meet Underwriters Laboratories (UL) test and approval requirements as stated in UL 844 for class 1, division 1, group D hazardous locations as defined in NFPA 70. The fixture assembly will include a light fixture, frangible-coupling, power disconnect switch that will kill power to the fixture if the frangible-coupling is broken, and a junction box. The lens/filter colors will meet MIL-C-25050.

3-4. Power supply and circuits

Runway lighting systems will be supplied through interleaved series circuits served by constant current regulators. The constant current regulators are designed for use on these heliport lighting systems and have provisions for varying output current from its rated value to lower values so that brightness of the lamps in the lighting system may be adjusted to suit the visibility conditions. This provision in the regulators is referred to as “Brightness Control”. The regulators will be as described in chapter 10.

a. Circuiting criteria. The number and type of regulators required will be determined by the length and number of runways and the number of lights per runway. Losses in volt-amperes for the circuit cable feeder cables from the vault to the lights should also be considered when designing the system. Regulators should always be loaded to at least one-half of rated kW output. Where more than one regulator is required per system, the load should be divided equally between the number of regulators used.

b. Transformers cables, and connectors. For installation requirements of such items, see chapter 8.

c. Cable used for series circuits will be No.8 AWG 1/C stranded, 5,000-volt, cross-linked polyethylene, conforming to Mil. Spec. MIL-C-38359.

d. Series transformers will be medium intensity type, 30/45 watts, 6.6/6.6-ampere, Item No.829 conforming to Mil. Spec. MIL-T-27535, and Mil. Std. 27289-1.

3-5. Control system

The heliport runway lighting control system is an integral part of the control system for all heliport lighting facilities. The function of this portion of the control system is to energize and deenergize the selected runway lighting system as well as to control the brightness of this system remotely, as required by the operations of the heliport. The runway lights will be controlled from the control tower and from the equipment vault as described in chapter 10. The control of heliport runway and taxiway lighting circuits will be somewhat different from that for airfields. The circuits will be provided and connected, as indicated on figure 3-1, with the runway-taxiway combination control panels and associated equipment connected, interlocked and/or non-interlocked as required to permit separate control of each runway lighting system, independent of the other, and permit simultaneous control of the taxiway lighting circuits T-1 and T-2 in combination. Taxiway lighting circuit T-IA will be connected for separate individual control. This will permit flexibility in operation of the runway and taxiway lights either singly or in combination, simultaneously, as required for the heliport operations by the control room operator. The layout will also provide facilities that will permit future changes in the type of method of operation of the heliport with minimum expense and interruption of service, should such conditions develop. The initial sequence of operations of the heliport lighting circuits anticipated is such that when a helicopter is utilizing the night lighting landing facilities of the heliport: (1) the blue taxiway lights (circuits T-1 and T-2) will be turned on, but (2) only the white and green/red runway threshold lights (circuits R-1 or R-2) of the runway in use will be turned on. Under condition (1) all blue lights will be turned on (for runways 1 and 2 and taxiways 1 and 2) except those around the threshold ends of the runway intersection; under condition (2) all white lights will be turned on for the selected runway in use, including alternate white and blue lights around the threshold ends of the runway intersection of the appropriate runway, thereby providing an alternate white and blue light runway configuration or pattern; also, the 180 degrees aviation green/180 degrees aviation red threshold lights at the ends of the appropriate runway will be lighted. For taxiing the helicopter to the hangar or to operations, apron, or parking areas, the helicopter pilot is provided, without any change in lighting circuit arrangement for runways 1 or 2, and taxiways 1 or 2, with the equivalent of taxi guidance (blue) lighting on the runway (alternate) being used temporarily

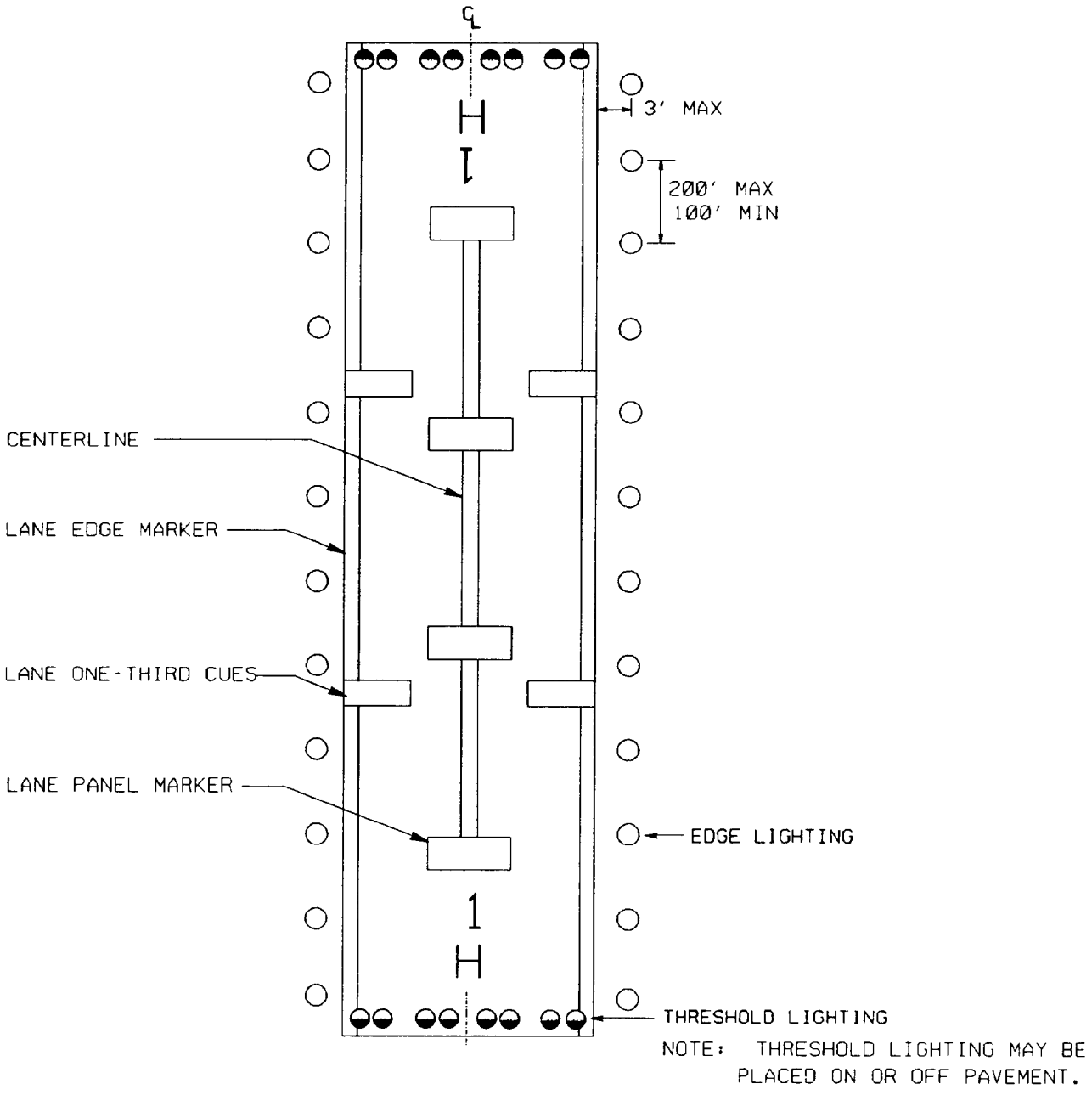


Figure 3-3. Typical layout of Army Helicoper stagefield lighting system.

as a taxiway over to the proper connecting taxiway T-1A leading to the hangar, operations, apron, or parking areas. Taxiway circuit No. T- 1A will be turned on at the appropriate time as required to provide the proper helicopter taxiway guidance, in accordance with operational requirements. An exception to the above is where only the basic one runway configuration exists or will be constructed. In such an instance, runway lighting circuit R-2 and taxiway lighting circuits T-1 and T-2 will not exist, and the heliport lighting system control sequence will be identical to that of an airfield. However, the control panel furnished and the lighting circuit designations will remain unchanged, to permit standardization of control procedures as well as provide for future installation of an intersecting runway with minimum system changes.